FORM FOUR CLUSTER KCSE MODEL8

CHEMISTRY PAPER 3 ANSWER

1.

Titration Number	1	2	3
Final burette Reading (cm^3)	12.5	25.0	37.5
Initial burette Reading (cm^3)	0.0	12.5	25.0
Volume of N used (cm^3)	12.5	12.5	12.5

a) Complete table 1mk

Complete table with 3 titrations done 1 mark

Incomplete table with 2 titrations done ½ mark

Incomplete table with 1 titration done 0

b) Use decimals 1 mark

c)i) Accuracy 1 mark

If atlest one of the candidates values is within $\pm$ 0.1 1 mark If no value is within $\pm$ 2 .0 of teachers ½

Primuth of averaging 1 Values to be averaged should be those within $\pm$ 2 .0 of each other. Final answer

1 **Calculations**

ii)

$\left(\frac{25.0\times1}{1000}\right)\sqrt{½}$

$=0.025\text{moles}\sqrt{½}$

iii

Mole ratio of $NaOH : H_2SO_4$

2 : 1

Number of moles of solution N= $\frac{0.025}{2}$ √½

=0.0125moles√½

iv)

$\frac{100 \times 0.0125}{average\ titre}$ √½

Answer √½

v)

Table 2

Conditions to apply as in table 1

Calculations

$$\text{No of moles of NaOH used} = \frac{25.0 \times 1}{1000}\ \sqrt{½}$$

$$= 0.025 \text{ moles}\sqrt{½}$$

Mole ratio NaOH : H_2SO_4

2 : 1 $\sqrt{½}$

$$\text{No of moles of solution K used} = \frac{0.025}{2}\ \sqrt{½}$$

$$= 0.0125\sqrt{½}$$

iii) Moles of H_2SO_4 in 100cm3 of solution

$$= \frac{100 \times 0.0125}{average\ titre}\ \sqrt{½}$$

Answer=$\sqrt{½}$

iv) No. of moles of) (H_2SO_4)=answer in(iv) above-answer in(b) (iii) of reacted 3 X_2CO_3

= Answer ½

Mole ratio $X_2CO_3 : H_2SO_4$

1 : 1$\sqrt{½}$

Moles of X_2CO_3 in 0.5 g = answer (iv) above.

0.5 g of X_2CO_3 $= answer\ (iv)\ above \times 1\ mole$

$$\text{Relative formula mass} = \frac{1 \times 0.5}{Answer\ in\ (iv)}\ \sqrt{½}$$

$$= \text{Answer} = \sqrt{½}$$

vi) 1 mole of X_2CO_3 = Answer in (v) above)

$$\therefore X = \frac{Answer\ in\ (v) - 60}{2}\ \sqrt{½}$$

$$= \text{Answer}\ \sqrt{½}$$

2. Temperature of ($CuSO_{4aq}$ = 24.0^{0}C (1 mark)

Highest temperature of mixture= 30.00C (1 mark

Temperature change ΔT =30-24=6^{O}C

Accuracy of reading temperature 1 mark

$$Cu^{2+}_{(aq)} + Zn_{(s)} + Cu_{(s)} + Zn^{2+}_{aq}$$

ii) Moles of copper sulphate used in the reaction.

ii) Moles of copper sulphate used in the reaction.

$\left(\frac{0.2\times 25}{1000}\right)\sqrt{1/2}$

$=0.005\text{mole}\sqrt{1/2}$

iii) Heat evolved $=\left(\frac{25}{1000}\times 4.2\times 6\right)\sqrt{1/2}$

$=0.63\text{kJ}\sqrt{1/2}$

iv) $0.005 moles \rightarrow 0.63 kJ$

$\therefore 1 mole \rightarrow \frac{0.63}{0.005}\times 1\sqrt{1}$

$= -126 kJ/mole\sqrt{1}$

3.

Inference

Possibly Zu^{2+}, Pb^{2+} or Al^{3+} *ions present* √1 for all the three. ½ for any two.

ii) **Observation**

-A white precipitate is formed.√½

-It dissolves in excess ammonia to form a colourless solution.√½

Inference

Zn^{2+} *ions present* √1 or Al^{3+}, Pb^{2+} *ion absebt*

iii) **Observation**

-A white precipitate is formed.√½

-The white precipitate is insoluble in an acid.√½

Inference

SO_4^{2-} ions present√1

b)i) **Observation**

-A pale blue precipitate is formed.√½

-The precipitate is insoluble in sodium hydroxide.√½

Inference

Cu^{2+} ions present.√1

ii) **Observation**

-A pale blue precipitate is formed.√½

-The precipitate dissolves in excess ammonia to form a deep blue solution.√½

Inference

Cu^{2+} ions present